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they serve. A national board of health must first supply the national need proven to exist, by the conjoined efforts of the efficiently organized State boards, and fill up the full measure of that work within the national boundaries. So established, in the same dignified relation to the National Government that such State boards bear to the governments of the several States, it is prepared to perform the twofold duty, beyond our borders, which results from our present knowledge of the modes of approach and attack of infectious diseases. It must protect the nation, first, by a thorough knowledge of the character, location, and movements of such diseases abroad; second, by preventing, by the best-known methods, the shipping to this country of infected persons, animals, or things; third, by insisting upon competent sanitary service on board ship, with the best facilities for preventing, controlling, and crushing out any form of infection discovered on the passage out; fourth, by providing that the sanitary authority at the port of entry shall be fully informed of what is known of the sanitary history of the ship and her lading, up to the date of arrival, with later telegraphic report from the American consul and health-officer at the port of departure, if necessary.

"It is a fact that to-day, if it will, our government may learn all that is here proposed, by locating competent health-officers at the foreign shipping ports, whence our greatest danger comes, and might keep the seaboard quarantine authorities fully posted in these important particulars. As to those local authorities, it is time to call a halt in the criticism of their work till all sides in the controversy can be heard; or, better still, till health-officers of inland States can visit and see for themselves. Until the State boards agree in organization and powers, and in proper relations to local boards, the re-organization of the National Health Service upon a sufficient and permanent basis will be difficult, if not impossible."

THE RESOURCES OF THE NYASSA REGION, EAST COAST OF AFRICA.

FOR a number of years two English companies have been carrying on a profitable trade in the Nyassa and Tanganyika region, which, however, has recently suffered a severe check by the uprising of the Arabs against European influence. In a recent number of the *Journal of the Manchester Geographical Society*, Messrs. James Stevenson and E. O'Neill, consul of this district, give some interesting reports on the state of affairs and on the resources of this country, from which, and from some observations of other travellers, we take the following notes. Mr. Stevenson's paper is accompanied by an interesting sketch-map, reproduced here, showing the extent of the ravages of the slave-trade and the caravan routes in this region. The map will be of interest as supplementing the general map of Africa showing the extent of the slave-trade, published in *Science* of Dec. 28, 1888.

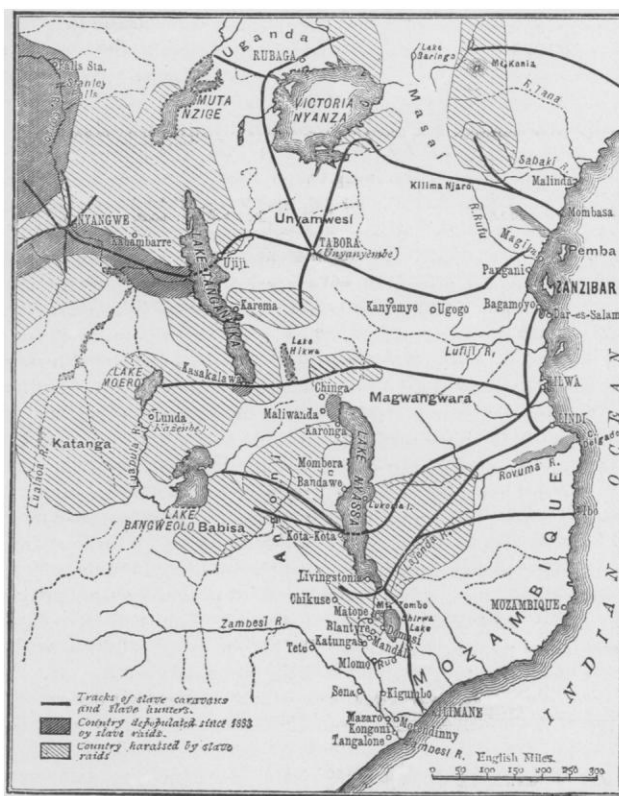
The produce of the Nyassa region, and the methods of trading, are well described by Mr. O'Neill. First in importance among the objects of trade is ivory. To this most valuable of all exports, — putting aside for the present any possible supply of minerals, — trade must chiefly look for an immediate return on its capital. Perhaps there are no better elephant-hunting fields in Central Africa than the great marshes of the Shire River and on the west coast of Lake Nyassa. The supply from these might be largely increased, to the benefit of trade, the country, and the people generally. The Arab slave-dealer is the chief collector of ivory in this country, with the tusks of which he loads his slaves, obtaining thereby cheap and profitable carriage to the coast. The British trader upon the Nyassa obtains but a fraction of the whole amount collected, — just so much as the Arab chooses to part with to enable himself to renew his supply of barter-goods, and to resume his collection in the interior. While the operations of the British trader on the Nyassa are confined to his station on the shores of the lake, he plays the dignified rôle of a storekeeper to Arab traders, where they may renew their store, and be relieved of a journey to the coast.

Much has been said of the check given to the slave-trade by the taking-up of the ivory on the Nyassa from the hands of the Arab collector, thus obviating the necessity for slave-carriage to the

coast. But it is certain that a very slight blow is struck by this means at the slave-trade. Little good will really be effected until the collection in the interior is also carried out by the whites, and the Arab trader is undersold, and thus peacefully ousted from the collecting-field. The British trader has every advantage on his side. Water-carriage should place his goods upon the Nyassa cheaper than they can be carried there overland by the Arabs, who have also to contend with the high percentage exacted from them for advances by the Indian trader of Zanzibar or Mozambique.

Next in importance to ivory must be placed India-rubber, in which the country west of Nyassa, stretching towards Lake Bangweolo, is undeniably rich; but comparatively little is collected, as the natives know little of the value of the plant, and have never been taught to collect it. Its export might probably be indefinitely increased by the same means which would help to extend the ivory-trade.

There are many other products indigenous to the country, but few of those known are able to bear the present cost of carriage to



the markets. When the country comes to be better known, the number of more valuable products will be undoubtedly increased. Consul O'Neill says in regard to this point: "How completely valuable products may remain hidden until some chance brings them to light, I can instance by the case of *Strophantus Kombe*, of which some specimens were sent by me to the Foreign Office in 1881. A demand for it as a drug for heart-disease shortly after sprung up, and, its existence in this country having been thus proved, I was able to start its collection in the Shire and Nyassa districts and in the Gaza country. The first consignment home proved to be so valuable to the collectors, that soon a rush was made to collect it, and the natives were quickly taught to bring down the pods in large loads. In the same manner we may hope other valuable products will come to light, and more profitable exports found than the oil-seeds which now form the staple articles of production on the coast and the lower Zambezi and Shire Rivers."

To estimate justly the probable development of this region, it must be remembered how slow and gradual has been the development of trade on the African coast. When the British Indian traders, to whom, a little more than a century ago, the Portuguese viceroys of India granted a monopoly of the trade of East Africa, arrived on

the coast, trade was precisely in the condition we find it now in the interior. The natives knew nothing of the collection of valuable products, — knew not, indeed, of their existence until shown. Now, on the coast, and for a hundred and two hundred miles inland, they have learned the demands of trade, and a regular collection is made by them of rubber, calumba, orchilla, and copal.

So far, we have spoken only of the export of produce indigenous to the country. When Europeans, however, begin to settle in it, — and in a small way this settlement has already begun, — fresh sources of wealth are opened up; and other products, for which the climate and soil are found favorable, are cultivated, and their export forms a valuable adjunct to that of the natural products of the country. Coffee and sugar have already been raised with success; and wheat, tea, and cinchona are all undergoing trial. The coffee and sugar consumed at the mission-stations are mostly home or Nyassa grown, and very good in flavor and strength. Recently Angora goats have been introduced for the production of mohair.

The climate of this region, which is from three thousand to five thousand feet above sea-level, is considered comparatively healthy, and, although it is not probable that it will ever become the home of a numerous white population, is well adapted to the establishment of plantations, worked by natives and managed by whites. The lake itself, which is only sixteen hundred feet above sea-level, has not as favorable a climate as have the slopes of the highlands.

The most important feature of the Nyassa region is its easy access. The uplands surrounding the Nyassa are divided by the only navigable waterway to the coast of Africa, and this alone marks it out as one of the first districts of East Central Africa for European occupation. There is nothing like it farther south, where European settlers are steadily advancing. To be able to step into a river-steamer at a seaport, as may be done now at the mouth of the Zambezi, and be carried up in five or six days to the foot of the Shire highlands, within a day's walk of the first settlements, is an immense step already gained. The new river-steamer plying on the Shire and Zambezi is a stern-wheeler, intended to carry seventy-five tons on a moderate draught. There is also a steamer of considerable size in course of construction on Lake Nyassa.

The trading company of Lake Nyassa, and the missions of that region, — the Free Church of Scotland Missions, which occupy the west coast of the lake; the Universities' Mission, which occupies the east coast of the lake, — have expended altogether some \$750,000 on this region. In pursuance of these objects, a survey was made of a road for about forty-six miles through the rough country of Lake Nyassa, towards Lake Tanganyika, which is reached from the terminal point of that road through an easy country. The road was made by native labor, and the traffic on it was at first worked by parties hired by the company from the Nkonde, Wanda, and Mambwe tribes, with all of whom the company made treaties by which its authority was recognized over these districts. At present its management has, however, slipped into the hands of the Arabs, who purchase goods at the Nyassa terminus, and convey them by their own people, often slaves, to Lake Tanganyika, the European staff being too limited in numbers to superintend all the stations required.

The steady advance of commerce in this region is seriously threatened by the progress of the Arabs, who have recently also invaded this country. For ninety miles along the south coast of Lake Tanganyika almost the whole population has been swept away or scattered, and in the adjoining fertile country of Ufipa the Arabs are now in great force.

During the last year, letters from the mission-stations expressed apprehensions, on account of the presence near Lake Nyassa of an Arab trader who had formerly made slave-raids in the Tanganyika region. These traders have congregated in numbers at the Nyassa end of the road, on account of the small steamer of the African Lakes Company having been for some time detained on account of disturbances. At various points besides the north end of the lake, the Arab invaders are ready, and have added to their old station at Kota-Kota one near Bandawe Mission; and besides Losewa and Makanjiva's, they have been aggressive near Blantyre.

All reports make it an undoubted fact that the question of commercial progress in Central Africa will solely depend upon the out-

come of the present struggle between Arabs and Europeans. The raids of the former are extending continually westward; and, wherever they have invaded a country, nothing but ruin remains. It appears doubtful whether the joint action of the European nations will succeed in breaking the power of the Arabs in the inaccessible fastnesses of Central Africa. It seems that the only means of success would be an absolute stoppage of the introduction of firearms, which would deprive the Arabs of a great part of their superiority over the native states.

BOOK-REVIEWS.

Occasional Addresses on Educational Subjects. By S. S. LAURIE. Cambridge, Eng., University Pr. 12°. (New York, Macmillan, \$1.25.)

PROFESSOR LAURIE, well known as lecturer on educational history and methods in the University of Edinburgh, here gives us another volume on his favorite themes. In it he touches on a great variety of educational topics, and handles most of them with ability as well as enthusiasm. Professor Laurie believes in the importance of studying educational theories and methods, and holds that no teacher is properly equipped for his work who has not been through a course of such study; and he gives excellent arguments and illustrations in support of this view. In regard to both subjects of study and methods of teaching, he is at issue with some enthusiasts of the present day, and especially with the advocates of manual training and competitive examinations. With respect to the latter, he takes the ground that competition in school is in its nature an evil, since it fosters "the desire to beat others, and exalt self over others," which he justly affirms to be anti-social. Moreover, he maintains that educational competition does not secure the best service to society. The whole lecture on this subject ought to be carefully read by American educators. He is opposed to free schools, and presents the well-worn arguments against them, but without adding any thing new.

With regard to subjects of study, Professor Laurie is a strong advocate of the humanities. He believes in technical schools in their proper place, but speaks slightly of manual training in ordinary schools, remarking, that, "if the spirit of man can be educated through his fingers, it is a pity that Plato and Shakspeare ever wrote, and Christ ever taught." The end of education, in his view, is not to make good workmen, but good men; and his school curriculum is arranged accordingly. He would abandon Greek as a required study, because of the importance of French and German, and would base the course of study in secondary schools on English and Latin. He has a strong and, we think, sound sense of the educational importance of literature, especially in its moral and æsthetic aspects; and he would also devote considerable time to national history and politics. Of the physical sciences he would teach only geography, which seems a very narrow view; though it must be added that he would have geography taught in a very wide and liberal spirit. In mathematics he would teach only the elementary branches; and in French and German, as much as there is time for. This programme is sure to provoke criticism, from the scientists at least; but Professor Laurie is evidently not averse to controversy. His whole book is very suggestive, and we trust will not be overlooked by any one interested in education.

A Treatise on Hydraulics. By MANSFIELD MERRIMAN. New York, Wiley. 8°. \$3.50.

THIS volume is intended mainly for the use of students in technical schools, and consequently the subject has been treated, and the material selected and arranged, with a view to meet the requirements of such students. The author, who is professor of civil engineering in Lehigh University, is gifted with a perspicuous and pleasing style, and has produced a book which will without doubt prove an acceptable text-book upon the subject. A brief interesting chapter is devoted to the units of measure, physical properties of water, atmospheric pressure, gravity, and computations. A few hints on methods of study, appended to this chapter, would be of service to students in any department of science. Then follow in regular order chapters on hydrostatics, theoretical hydraulics, and the flow of water through orifices, over weirs and in